



DEPARTMENT OF ENERGY

10 CFR Part 430

[EERE-2017-BT-STD-0019]

RIN 1904-AD91

Energy Conservation Program: Energy Conservation Standards for Consumer Water Heaters

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Notification of availability of preliminary technical support document and request for comment.

SUMMARY: The U.S. Department of Energy (DOE or the Department) announces the availability of the preliminary analysis it has conducted for purposes of evaluating the need for amended energy conservation standards for consumer water heaters, which is set forth in the Department's preliminary technical support document (TSD) for this rulemaking. DOE will hold a public meeting via webinar to discuss and receive comment on its preliminary analysis. The meeting will cover the analytical framework, models, and tools used to evaluate potential standards; the results of preliminary analyses performed; potential energy conservation standard levels derived from these analyses (if DOE determines that proposed amendments are necessary); and other relevant issues. In addition, DOE encourages written comments on these subjects.

DATES: *Comments:* DOE will accept written comments, data, and information regarding its preliminary analysis for consumer water heaters no later than [INSERT

DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

Meeting: DOE will hold a public meeting via webinar on Tuesday, April 12, 2022, from 1:00 p.m. to 5:00 p.m. See section IV, “Public Participation,” for webinar registration information, participant instructions, and information about the capabilities available to webinar participants.

ADDRESSES: Interested persons are encouraged to submit comments using the Federal eRulemaking Portal at *www.regulations.gov*. Follow the instructions for submitting comments. Alternatively, interested persons may submit comments, identified by docket number EERE–2017–BT–STD–0019 and/or RIN 1904-AD91, by any of the following methods:

1. *Federal eRulemaking Portal:* *www.regulations.gov*. Follow the instructions for submitting comments.
2. *E-mail:* to *ConsumerWaterHeaters2017STD0019@ee.doe.gov*. Include docket number EERE–2017–BT–STD–0019 and/or RIN 1904-AD91 in the subject line of the message.

No telefacsimiles (faxes) will be accepted. For detailed instructions on submitting comments and additional information on this process, see section IV of this document (Public Participation).

Although DOE has routinely accepted public comment submissions through a variety of mechanisms, including postal mail and hand delivery/courier, the Department has found it necessary to make temporary modifications to the comment submission process in light of the ongoing coronavirus (COVID-19) pandemic. DOE is currently suspending receipt of public comments via postal mail and hand delivery/courier. If a

commenter finds that this change poses an undue hardship, please contact Appliance Standards Program staff at (202) 586-1445 to discuss the need for alternative arrangements. Once the COVID-19 pandemic health emergency is resolved, DOE anticipates resuming all of its regular options for public comment submission, including postal mail and hand delivery/courier.

To inform interested parties and to facilitate this rulemaking process, DOE has prepared an agenda, a preliminary TSD, and briefing materials, which are available on the DOE website at:

www1.eere.energy.gov/buildings/appliance_standards/standards.aspx?productid=32.

Docket: The docket for this activity, which includes *Federal Register* notices, comments, and other supporting documents/materials, is available for review at www.regulations.gov. All documents in the docket are listed in the www.regulations.gov index. However, not all documents listed in the index may be publicly available, such as those containing information that is exempt from public disclosure.

The docket webpage can be found at www.regulations.gov/docket/EERE-2017-BT-STD-0019. The docket webpage contains instructions on how to access all documents, including public comments, in the docket. See section IV (Public Participation) for information on how to submit comments through www.regulations.gov.

FOR FURTHER INFORMATION CONTACT: Ms. Julia Hegarty, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Office, EE-5B, 1000 Independence Avenue, SW., Washington, DC 20585-0121. Telephone: (240) 597-6737. E-mail: ApplianceStandardsQuestions@ee.doe.gov.

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For further information on how to submit a comment, review other public comments and the docket, or participate in the public meeting webinar, contact the Appliance and Equipment Standards Program staff at (202) 287-1445 or by e-mail: *ApplianceStandardsQuestions@ee.doe.gov*.

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I. Introduction

A. Authority

The Energy Policy and Conservation Act, as amended (EPCA),¹ Pub. L. 94-163 (42 U.S.C. 6291-6317, as codified), authorizes DOE to regulate the energy efficiency of a number of consumer products and certain industrial equipment. Title III, Part B² of EPCA established the Energy Conservation Program for Consumer Products Other Than Automobiles. (42 U.S.C. 6291-6309) These products include consumer water heaters, the subject of this document. (42 U.S.C. 6292(a)(4))

EPCA prescribed energy conservation standards for these products (42 U.S.C. 6295(e)(1)), and the statute directed DOE to conduct two cycles of rulemakings to determine whether to amend these standards (42 U.S.C. 6295(e)(4)). EPCA further provides that, not later than 6 years after the issuance of any final rule establishing or amending a standard, DOE must publish either a notification of determination that standards for the product do not need to be amended, or a notice of proposed rulemaking (NOPR) including new proposed energy conservation standards (proceeding to a final rule, as appropriate). (42 U.S.C. 6295(m)(1)) Not later than three years after issuance of a final determination not to amend standards, DOE must publish either a notice of determination that standards for the product do not need to be amended, or a NOPR including new proposed energy conservation standards (proceeding to a final rule, as appropriate). (42 U.S.C. 6295(m)(3)(B))

DOE completed the first of these rulemaking cycles on January 17, 2001, by publishing in the *Federal Register* a final rule amending the energy conservation standards for consumer water heaters. 66 FR 4474 (*establishing* amended standards with

¹ All references to EPCA in this document refer to the statute as amended through the Infrastructure Investment and Jobs Act, Pub. L. 117-58 (Nov. 15, 2021).

² For editorial reasons, upon codification in the U.S. Code, Part B was redesignated Part A.

a requirement for compliance starting on January 20, 2004) (January 2001 Final Rule). Subsequently, DOE completed the second rulemaking cycle to amend the standards for consumer water heaters by publishing a final rule in the *Federal Register* on April 16, 2010. 75 FR 20112 (*establishing* amended consumer water heater standards with a requirement for compliance starting on April 16, 2015) (April 2010 Final Rule). As directed by later amendments to EPCA³ (*see* 42 U.S.C. 6295(e)(5)(B)), on July 11, 2014, DOE published in the *Federal Register* a final rule amending the test procedure for consumer water heaters to change the efficiency metric from energy factor (EF) to uniform energy factor (UEF). 79 FR 40542. The existing EF-based energy conservation standards were then translated from EF to UEF in a separate DOE conversion factor final rule published in the *Federal Register* on December 29, 2016, that established a method for converting EF to UEF for water heater basic models that were previously in existence. 81 FR 96204 (December 2016 Conversion Factor Final Rule). The current energy conservation standards for consumer water heaters are located in the Code of Federal Regulations (CFR) at 10 CFR 430.32(d) and are set forth in Table II.1 in section A of this document. The currently applicable DOE test procedures for consumer water heaters appear at 10 CFR part 430, subpart B, appendix E (Appendix E).

Pursuant to EPCA, any new or amended energy conservation standard must be designed to achieve the maximum improvement in energy efficiency that DOE determines is technologically feasible and economically justified. (42 U.S.C. 6295(o)(2)(A)) Furthermore, the new or amended standard must result in a significant conservation of energy. (42 U.S.C. 6295(o)(3)(B))

³ The requirement for a consumer water heater test procedure using uniform energy factor as a metric, as well as the requirement for DOE to undertake a conversion factor rulemaking to translate existing consumer water heater standards denominated in terms of EF to ones denominated in terms of UEF, were part of the amendments to EPCA contained in the American Energy Manufacturing Technical Corrections Act (AEMTCA), Pub. L. 112-210 (Dec. 18, 2012).

DOE is publishing this preliminary analysis to collect data and information to inform its decision consistent with its obligations under EPCA.

B. Rulemaking Process

DOE must follow specific statutory criteria for prescribing new or amended standards for covered products, including consumer water heaters. As noted, EPCA requires that any new or amended energy conservation standard prescribed by the Secretary of Energy (Secretary) be designed to achieve the maximum improvement in energy efficiency (or water efficiency for certain products specified by EPCA) that is technologically feasible and economically justified. (42 U.S.C. 6295(o)(2)(A)) Furthermore, DOE may not adopt any standard that would not result in significant conservation of energy. (42 U.S.C. 6295(o)(3)(B))

The significance of energy savings offered by a new or amended energy conservation standard cannot be determined without knowledge of the specific circumstances surrounding a given rulemaking.⁴ For example, the United States rejoined the Paris Agreement on February 19, 2021. As part of that agreement, the United States has committed to reducing greenhouse gas (GHG) emissions in order to limit the rise in mean global temperature. As such, energy savings that reduce GHG emissions have taken on greater importance. Additionally, some covered products and equipment have most of their energy consumption occur during periods of peak energy demand. The impacts of these products on the U.S. energy infrastructure can be more pronounced than those of products with relatively constant demand. In evaluating the significance of energy savings, DOE considers differences in not only site energy use, but also primary energy and full-fuel-cycle (FFC) effects for different covered products and equipment when determining whether energy savings are significant. Primary energy and FFC

⁴ See 86 FR 70892, 70901 (Dec. 13, 2021).

effects include the energy consumed in electricity production (depending on load shape), in distribution and transmission, and in extracting, processing, and transporting primary fuels (*i.e.*, coal, natural gas, petroleum fuels), and, thus, present a more complete picture of the impacts of energy conservation standards⁵. Accordingly, DOE evaluates the significance of energy savings on a case-by-case basis.

To determine whether a proposed new or amended energy conservation standard is economically justified, EPCA requires that DOE determine whether the benefits of the standard exceed its burdens by considering, to the greatest extent practicable, the following seven factors:

- (1) The economic impact of the standard on the manufacturers and consumers of the products subject to the standard;
- (2) The savings in operating costs throughout the estimated average life of the covered products in the type (or class) compared to any increase in the price, initial charges, or maintenance expenses for the covered products that are likely to result from the standard;
- (3) The total projected amount of energy (or as applicable, water) savings likely to result directly from the standard;
- (4) Any lessening of the utility or the performance of the products likely to result from the standard;
- (5) The impact of any lessening of competition, as determined in writing by the Attorney General, that is likely to result from the standard;
- (6) The need for national energy and water conservation; and

⁵ The FFC metric is discussed in DOE's statement of policy and notice of policy amendment. 76 FR 51282 (Aug. 18, 2011), as amended at 77 FR 49701 (Aug. 17, 2012).

(7) Other factors the Secretary of Energy considers relevant.

(42 U.S.C. 6295(o)(2)(B)(i)(I)–(VII))

DOE fulfills these and other applicable requirements by conducting a series of analyses throughout the rulemaking process. Table I.1 shows the individual analyses that are performed to satisfy each of the requirements within EPCA.

Table I.1 EPCA Requirements and Corresponding DOE Analysis

EPCA Requirement	Corresponding DOE Analysis
Significant Energy Savings	<ul style="list-style-type: none">• Shipments Analysis• National Impact Analysis• Energy Analysis
Technological Feasibility	<ul style="list-style-type: none">• Market and Technology Assessment• Screening Analysis• Engineering Analysis
Economic Justification:	
1. Economic impact on manufacturers and consumers	<ul style="list-style-type: none">• Manufacturer Impact Analysis• Life-Cycle Cost and Payback Period Analysis• Life-Cycle Cost Subgroup Analysis• Shipments Analysis
2. Lifetime operating cost savings compared to increased cost for the product	<ul style="list-style-type: none">• Mark-ups for Product Price Analysis• Energy Analysis• Life-Cycle Cost and Payback Period Analysis
3. Total projected energy savings	<ul style="list-style-type: none">• Shipments Analysis• National Impact Analysis
4. Impact on utility or performance	<ul style="list-style-type: none">• Screening Analysis• Engineering Analysis
5. Impact of any lessening of competition	<ul style="list-style-type: none">• Manufacturer Impact Analysis
6. Need for national energy and water conservation	<ul style="list-style-type: none">• Shipments Analysis• National Impact Analysis
7. Other factors the Secretary considers relevant	<ul style="list-style-type: none">• Employment Impact Analysis• Utility Impact Analysis• Emissions Analysis

	<ul style="list-style-type: none"> • Monetization of Emission Reductions Benefits⁶ • Regulatory Impact Analysis
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Further, EPCA establishes a rebuttable presumption that a standard is economically justified if the Secretary finds that the additional cost to the consumer of purchasing a product complying with an energy conservation standard level will be less than three times the value of the energy savings during the first year that the consumer will receive as a result of the standard, as calculated under the applicable test procedure. (42 U.S.C. 6295(o)(2)(B)(iii))

EPCA also contains what is known as an “anti-backsliding” provision, which prevents the Secretary from prescribing any amended standard that either increases the maximum allowable energy use or decreases the minimum required energy efficiency of a covered product. (42 U.S.C. 6295(o)(1)) Also, the Secretary may not prescribe an amended or new standard if interested persons have established by a preponderance of the evidence that the standard is likely to result in the unavailability in the United States in any covered product type (or class) of performance characteristics (including reliability), features, sizes, capacities, and volumes that are substantially the same as those generally available in the United States. (42 U.S.C. 6295(o)(4))

Additionally, EPCA specifies requirements when promulgating an energy conservation standard for a covered product that has two or more subcategories. DOE must specify a different standard level for a type or class of product that has the same function or intended use, if DOE determines that products within such group: (A) consume a different kind of energy from that consumed by other covered products within

⁶ Currently, in compliance with the preliminary injunction issued on February 11, 2022, in *Louisiana v. Biden*, No. 21-cv-1074-JDC-KK (W.D. La.), DOE is not monetizing the costs of greenhouse gas emissions.

such type (or class); or (B) have a capacity or other performance-related feature which other products within such type (or class) do not have and such feature justifies a higher or lower standard. (42 U.S.C. 6295(q)(1)) In determining whether a performance-related feature justifies a different standard for a group of products, DOE must consider such factors as the utility to the consumer of the feature and other factors DOE deems appropriate. *Id.* Any rule prescribing such a standard must include an explanation of the basis on which such higher or lower level was established. (42 U.S.C. 6295(q)(2))

Finally, pursuant to the amendments to EPCA contained in the Energy Independence and Security Act of 2007 (EISA 2007), Pub. L. 110-140, any final rule for new or amended energy conservation standards promulgated after July 1, 2010, is required to address standby mode and off mode energy use. (42 U.S.C. 6295(gg)(3)) Specifically, when DOE adopts a standard for a covered product after that date, it must, if justified by the criteria for adoption of standards under EPCA (42 U.S.C. 6295(o)), incorporate standby mode and off mode energy use into a single standard, or, if that is not feasible, adopt a separate standard for such energy use for that product. (42 U.S.C. 6295(gg)(3)(A)-(B)) DOE's current test procedures for consumer water heaters address standby mode and off mode energy use. In this rulemaking, DOE intends to incorporate such energy use into any amended energy conservation standards it adopts in the final rule.

Before proposing a standard, DOE typically seeks public input on the analytical framework, models, and tools that DOE intends to use to evaluate potential standards for the product at issue and the results of preliminary analyses DOE performed for the product.

DOE is examining whether to amend the current energy conservation standards for consumer water heaters pursuant to its obligations under EPCA. This document

announces the availability of the preliminary TSD, which details the preliminary analyses and summarizes the preliminary results of DOE's analyses. In addition, DOE is announcing a public meeting webinar to solicit feedback from interested parties on its analytical framework, models, and preliminary results.

C. Deviation from Appendix A

In accordance with section 3(a) of 10 CFR part 430, subpart C, appendix A ("appendix A"), DOE notes that it is deviating from the provision in appendix A regarding the pre-NOPR stages for an energy conservation standards rulemaking. *See* 86 FR 70892 (Dec. 13, 2021) (effective January 12, 2022). Section 6(a)(2) of appendix A states that if the Department determines it is appropriate to proceed with a rulemaking, the preliminary stages of a rulemaking to issue or amend an energy conservation standard that DOE will undertake will be a framework document and preliminary analysis, or an advance notice of proposed rulemaking.

DOE is opting to deviate from this step by publishing a preliminary analysis without a framework document. A framework document is intended to introduce and summarize the various analyses DOE conducts during the rulemaking process and requests initial feedback from interested parties. As discussed further in section B, prior to this notification of the preliminary analysis DOE published a request for information ("RFI") in which DOE identified and sought comment on the analyses conducted in support of the most recent energy conservation standards rulemakings. 85 FR 30853 (May 21, 2020; "May 2020 RFI"). Specifically, in the May 2020 RFI, DOE sought data and information as to whether any new or amended rule would be cost effective, economically justified, technologically feasible, or would result in a significant savings of energy. 85 FR 30853, 30855. DOE sought such data and information to assist in its consideration of whether (and if so, how) to amend the standards for consumer water

heater. *Id.* Further, DOE provided an overview of the analysis it would use to evaluate new or amended energy conservation standards, including references to and requests for comment on the analyses conducted as part of the most recent energy conservation standards rulemakings. *See* 85 FR 30853, 30859–30877. As DOE is intending to rely on substantively the same analytical methods as in the most recent rulemaking, publication of a framework document would be largely redundant with the published May 2020 RFI. As such, DOE is not publishing a framework document.

Section 6(d)(2) of appendix A provides that the length of the public comment period for pre-NOPR rulemaking documents will vary depending upon the circumstances of the particular rulemaking, but will not be less than 75 calendar days. For this preliminary analysis, DOE has opted to provide a 60-day comment period. As stated, DOE requested comment in the May 2020 RFI on the previous energy conservation standards analyses. For this preliminary analysis, DOE has relied on many of the same analytical assumptions and approaches as used in the previous rulemaking and has determined that a 60-day comment period in conjunction with the prior comment period for the May 2020 RFI provides sufficient time for interested parties to review the preliminary analysis and develop comments.

II. Background

A. Current Standards

In a final rule published in the *Federal Register* on April 16, 2010 (April 2010 Final Rule), DOE prescribed the current energy conservation standards for consumer water heaters, which are applicable to such products manufactured on and after April 16, 2015. 75 FR 20111, 20234.

As explained in section A of this document, DOE published the December 2016 Conversion Factor Final Rule in the *Federal Register* (81 FR 96204 (Dec. 29, 2016)) to convert standards based on EF to standards based on UEF, the metric produced by the amended test procedure established by the July 2014 Final Rule (79 FR 40542 (July 11, 2014)). These standards are set forth in DOE’s regulations at 10 CFR 430.32(d) and are repeated here in Table II.1.

Table II.1 Federal Energy Conservation Standards for Consumer Water Heaters

Product class	Rated storage volume and input rating (if applicable)	Draw pattern	Uniform energy factor
Gas-fired Storage Water Heater	≥ 20 gal and ≤ 55 gal	Very Small	$0.3456 - (0.0020 \times V_r)$
		Low	$0.5982 - (0.0019 \times V_r)$
		Medium	$0.6483 - (0.0017 \times V_r)$
		High	$0.6920 - (0.0013 \times V_r)$
	> 55 gal and ≤ 100 gal	Very Small	$0.6470 - (0.0006 \times V_r)$
		Low	$0.7689 - (0.0005 \times V_r)$
		Medium	$0.7897 - (0.0004 \times V_r)$
		High	$0.8072 - (0.0003 \times V_r)$
Oil-fired Storage Water Heater	≤ 50 gal	Very Small	$0.2509 - (0.0012 \times V_r)$
		Low	$0.5330 - (0.0016 \times V_r)$
		Medium	$0.6078 - (0.0016 \times V_r)$
		High	$0.6815 - (0.0014 \times V_r)$
Electric Storage Water Heater	≥ 20 gal and ≤ 55 gal	Very Small	$0.8808 - (0.0008 \times V_r)$
		Low	$0.9254 - (0.0003 \times V_r)$
		Medium	$0.9307 - (0.0002 \times V_r)$
		High	$0.9349 - (0.0001 \times V_r)$
	> 55 gal and ≤ 120 gal	Very Small	$1.9236 - (0.0011 \times V_r)$
		Low	$2.0440 - (0.0011 \times V_r)$
		Medium	$2.1171 - (0.0011 \times V_r)$
		High	$2.2418 - (0.0011 \times V_r)$
Tabletop Water Heater	≥ 20 gal and ≤ 120 gal	Very Small	$0.6323 - (0.0058 \times V_r)$
		Low	$0.9188 - (0.0031 \times V_r)$
		Medium	$0.9577 - (0.0023 \times V_r)$
		High	$0.9884 - (0.0016 \times V_r)$
Instantaneous Gas-fired Water Heater	< 2 gal and $> 50,000$ Btu/h	Very Small	0.80
		Low	0.81
		Medium	0.81
		High	0.81
Instantaneous Electric Water Heater	< 2 gal	Very Small	0.91
		Low	0.91
		Medium	0.91

		High	0.92
Grid-Enabled Water Heater	>75 gal	Very Small	$1.0136 - (0.0028 \times V_r)$
		Low	$0.9984 - (0.0014 \times V_r)$
		Medium	$0.9853 - (0.0010 \times V_r)$
		High	$0.9720 - (0.0007 \times V_r)$

* "V_r" is the Rated Storage Volume (in gallons), as determined pursuant to 10 CFR 429.17.

As stated in section A of this document, EPCA, as amended, prescribed initial energy conservation standards for consumer water heaters, as shown in Table II.2. (42 U.S.C. 6295(e)(1)) DOE notes that the statutory energy conservation standards apply to both storage and instantaneous consumer water heaters regardless of volume capacity. As such, the energy conservation standards shown in Table II.2 would cover the volume and input rate ranges not included in Table II.1.

Table II.2 Consumer Water Heater Energy Conservation Standards Prescribed by EPCA

Product Class	The Energy Factor shall be not less than the following for products manufactured on or after January 1, 1990.
Gas Water Heater	$0.62 - (0.0019 \times \text{Rated Storage Volume in gallons})$
Oil Water Heater	$0.59 - (0.0019 \times \text{Rated Storage Volume in gallons})$
Electric Water Heater	$0.95 - (0.00132 \times \text{Rated Storage Volume in gallons})$

B. Current Process

As stated, on May 21, 2020, DOE published notice in the *Federal Register* through a request for information that it was initiating a review to determine whether any new or amended standards for consumer water heaters would satisfy the relevant requirements of EPCA. 85 FR 30853. Specifically, through the published notice and RFI, DOE sought data and information that could enable the agency to determine whether DOE should propose a “no new standard” determination because a more-stringent standard: (1) would not result in a significant savings of energy; (2) is not technologically feasible; (3) is not economically justified; or (4) any combination of foregoing. *Id.* at 85 FR 30855.

Comments received to date as part of the current process have helped DOE identify and resolve issues related to development of the preliminary analyses. Chapter 2 of the preliminary TSD summarizes and addresses the comments received. Further comments are requested throughout the preliminary TSD and executive summary.

III. Summary of the Analyses Performed by DOE

For the products covered in this preliminary analysis, DOE conducted in-depth technical analyses in the following areas: (1) engineering; (2) mark-ups to determine product price; (3) energy use; (4) life cycle cost (LCC) and payback period (PBP); and (5) national impacts. The preliminary TSD that presents the methodology and results of each of these analyses is available at:

www1.eere.energy.gov/buildings/appliance_standards/standards.aspx?productid=32.

DOE also conducted, and has included in the preliminary TSD, several other analyses that support the major analyses or are preliminary analyses that will be expanded if DOE determines that a NOPR is warranted to propose new or amended energy conservation standards. These analyses include: (1) the market and technology assessment; (2) the screening analysis, which contributes to the engineering analysis; and (3) the shipments analysis, which contributes to the LCC and PBP analysis and the national impact analysis (NIA). In addition to these analyses, DOE has begun preliminary work on the manufacturer impact analysis and has identified the methods to be used for the consumer subgroup analysis, the emissions analysis, the employment impact analysis, the regulatory impact analysis, and the utility impact analysis. DOE will expand on these analyses in the NOPR, should one be issued.

A. Engineering Analysis

The purpose of the engineering analysis is to establish the relationship between the efficiency and cost of consumer water heaters. There are two elements to consider in the engineering analysis: (1) the selection of efficiency levels to analyze (*i.e.*, the “efficiency analysis”) and (2) the determination of product cost at each efficiency level (*i.e.*, the “cost analysis”). In determining the performance of higher-efficiency products, DOE considers technologies and design option combinations not eliminated by the screening analysis. For each product class, DOE estimates the baseline cost, as well as the incremental cost, for the product/equipment at efficiency levels above the baseline. The output of the engineering analysis is a set of cost-efficiency “curves” that are used in downstream analyses (*i.e.*, the LCC and PBP analyses and the NIA).

DOE converts the Manufacture Production Cost (MPC) to the manufacturer selling price (MSP) by applying a manufacturer mark-up. The MSP is the price the manufacturer charges its first customer, when selling into the consumer water heater distribution channels. The manufacturer mark-up accounts for manufacturer non-production costs and profit margin. DOE developed the manufacturer mark-up by examining publicly-available financial information for manufacturers of the covered product.

See Chapter 5 of the preliminary TSD for additional detail on the engineering analysis and Chapter 12 of the preliminary TSD for additional detail on the manufacturer mark-up.

B. Mark-ups Analysis

The mark-ups analysis develops appropriate mark-ups (*e.g.*, retailer mark-ups, distributor mark-ups, contractor mark-ups) in the distribution chain and sales taxes to

convert MSP estimates derived in the engineering analysis to consumer prices, which are then used in the LCC and PBP analysis. At each step in the distribution channel, companies mark up the price of the product to cover business costs and profit margin.

DOE developed baseline and incremental markups for each actor in the distribution chain for consumer water heaters. Baseline mark-ups are applied to the price of products with baseline efficiency, while incremental mark-ups are applied to the difference in price between baseline and higher-efficiency models (the incremental cost increase). The incremental mark-up is typically less than the baseline mark-up and is designed to maintain similar per-unit operating profit before and after new or amended standards.⁷

Chapter 6 of the preliminary TSD provides details on DOE's development of mark-ups for consumer water heaters.

C. Energy Use Analysis

The purpose of the energy use analysis is to determine the annual energy consumption of consumer water heaters at different efficiencies in representative U.S. single-family homes, multi-family residences, and commercial buildings, and to assess the energy savings potential of increased consumer water heater efficiency. The energy use analysis estimates the range of energy use of consumer water heaters in the field (*i.e.*, as they are actually used by consumers). In addition, the energy use analysis provides the basis for other analyses DOE performed, particularly assessments of the energy savings

⁷ Because the projected price of standards-compliant products is typically higher than the price of baseline products, using the same mark-up for the incremental cost and the baseline cost would result in higher per-unit operating profit. While such an outcome is possible, DOE maintains that in markets that are reasonably competitive, it is unlikely that standards would lead to a sustainable increase in profitability in the long run.

and the savings in consumer operating costs that could result from adoption of amended or new energy conservation standards.

Chapter 7 of the preliminary TSD addresses the energy use analysis.

D. Life-Cycle Cost and Payback Period Analyses

The effect of new or amended energy conservation standards on individual consumers usually involves a reduction in operating cost and an increase in purchase cost. DOE used the following two metrics to measure consumer impacts:

- The LCC is the total consumer expense of an appliance or product over the life of that product, consisting of total installed cost (manufacturer selling price, distribution chain mark-ups, sales tax, and installation costs) plus operating costs (expenses for energy use, maintenance, and repair). To compute the operating costs, DOE discounts future operating costs to the time of purchase and sums them over the lifetime of the product.
- The PBP is the estimated amount of time (in years) it takes consumers to recover the increased purchase cost (including installation) of a more-efficient product through lower operating costs. DOE calculates the PBP by dividing the change in purchase cost at higher efficiency levels by the change in annual operating cost for the year that amended or new standards are assumed to take effect.

Chapter 8 of the preliminary TSD addresses the LCC and PBP analyses.

E. National Impact Analysis

The NIA estimates the national energy savings (NES) and the net present value (NPV) of total consumer costs and savings expected to result from amended standards at

specific efficiency levels (referred to as candidate standard levels).⁸ DOE calculates the NES and NPV for the potential standard levels considered based on projections of annual product shipments, along with the annual energy consumption and total installed cost data from the energy use and LCC analyses. For the present analysis, DOE projected the energy savings, operating cost savings, product costs, and NPV of consumer benefits over the lifetime of consumer water heaters sold from 2030 through 2059.

DOE evaluates the impacts of new or amended standards by comparing a case without such standards with standards-case projections. The no-new-standards case characterizes energy use and consumer costs for each product class in the absence of new or amended energy conservation standards. For this projection, DOE considers historical trends in efficiency and various forces that are likely to affect the mix of efficiencies over time. DOE compares the no-new-standards case with projections characterizing the market for each product class if DOE adopted new or amended standards at specific energy efficiency levels for that class. For each efficiency level, DOE considers how a given standard would likely affect the market shares of product with efficiencies greater than the standard.

For the NIA, DOE uses a spreadsheet model to calculate the energy savings and the national consumer costs and savings from each efficiency level. Interested parties can review DOE's analyses by changing various input quantities within the spreadsheet. The NIA spreadsheet model uses typical values (as opposed to probability distributions) as inputs. Critical inputs to this analysis include shipments projections, estimated product lifetimes, product installed costs and operating costs, product annual energy

⁸ The NIA accounts for impacts in the 50 States and U.S. territories.

consumption, the base-case efficiency projection, product switching parameters, and discount rates. Chapter 10 of the preliminary TSD addresses the NIA.

F. Other Analyses

As stated in section A of this document, EPCA does not prescribe storage volume or minimum input rating limits within its definition of consumer “water heater.”

However, DOE’s energy conservation standards for consumer water heaters at 10 CFR 430.32(d) do not include certain storage volume and input rating ranges. The storage volume and input rating ranges currently covered by the statutory standards at 42 U.S.C. 6295(e)(1) but not included in the list of energy conservation standards in DOE’s regulations at 10 CFR 430.32(d) are set forth in Table III.1.

Table III.1 Consumer Water Heaters Without UEF-based Energy Conservation Standards

Product Class	Rated storage volume and input rating (if applicable)
Gas-fired Storage	<20 gal
	>100 gal
Oil-fired Storage	>50 gal
Electric Storage	<20 gal
	>120 gal
Tabletop	<20 gal
	>120 gal
Gas-fired Instantaneous	<2 gal and $\leq 50,000$ Btu/h
	≥ 2 gal and ≤ 50 kBtu/h
	≥ 2 gal and > 50 kBtu/h
Oil-fired Instantaneous	All
Electric Instantaneous	≥ 2 gal

In the December 2016 Conversion Factor Final Rule, DOE stated that it would not enforce the statutory standards (*i.e.*, those prescribed by EPCA but are not codified in the CFR) applicable to the consumer water heaters that did not have a standard within the CFR until some point after DOE finalizes the conversion factor and the converted standards applicable to those products. 81 FR 96204, 96211 (Dec. 29, 2016). DOE will consider and may establish energy conservation standards for these products in this rulemaking. See Chapter 5 of the preliminary TSD for additional detail on the

conversion of the remaining EF-based standards established by EPCA to UEF-based standards.

On January 11, 2022, DOE published a test procedure NOPR in the *Federal Register* which proposed new definitions for certain types of consumer water heaters. 87 FR 1554 (January 2022 WH TP NOPR). These definitions included “circulating water heater”⁹ and “low temperature water heater.”¹⁰ These water heaters cannot be tested using the existing test procedure in Appendix E but can be tested using the proposed test procedures found in the January 2022 WH TP NOPR. See Chapter 5 of the preliminary TSD for additional detail on the product classes in which these products are covered and a discussion of the applicable energy conservation standards.

IV. Public Participation

DOE invites public engagement in this process through participation in the webinar and submission of written comments, data, and information. After the webinar and the closing of the comment period, DOE will consider all timely-submitted comments and additional information obtained from interested parties, as well as information obtained through further analyses. Following such consideration, the Department will publish either a determination that the energy conservation standards for consumer water heaters need not be amended or a NOPR proposing to amend those

⁹ The January 2022 WH TP NOPR proposed to define “circulating water heater” at 10 CFR 430.2 as an instantaneous or heat pump type water heater that does not have an operational scheme in which the burner, heating element, or compressor initiates and terminates heating based on sensing flow; has a water temperature sensor located at the inlet of the water heater or in a separate storage tank that is the primary means of initiating and terminating heating; and, must be used in combination with a recirculating pump and either a separate storage tank or water circulation loop in order to achieve the water flow and temperature conditions recommended in the manufacturer’s installation and operation instructions. 87 FR 1554, 1595 (Jan. 11, 2022).

¹⁰ The January 2022 WH TP NOPR proposed to define a “low temperature water heater” as an electric instantaneous water heater that is not a circulating water heater and cannot deliver water at a temperature greater than or equal to the set point temperature specified in section 2.5 of appendix E to subpart B of this part when supplied with water at the supply water temperature specified in section 2.3 of appendix E to subpart B of this part. 87 FR 1554, 1595 (Jan. 11, 2022).

standards. The NOPR, should one be issued, would include proposed energy conservation standards for the products covered by this rulemaking, and members of the public would be given an opportunity to submit written and oral comments on the proposed standards.

A. Participation in the Webinar

The time and date of the webinar meeting are listed in the **DATES** section at the beginning of this document. Webinar registration information, participant instructions, and information about the capabilities available to webinar participants will be published on DOE's website:

www1.eere.energy.gov/buildings/appliance_standards/standards.aspx?productid=32.

Participants are responsible for ensuring their systems are compatible with the webinar software.

B. Procedure for Submitting Prepared General Statements for Distribution

Any person who has an interest in the topics addressed in this document, or who is representative of a group or class of persons that has an interest in these issues, may request an opportunity to make an oral presentation at the public meeting webinar. Such persons may submit requests to speak via email to the Appliance and Equipment Standards Program at: ApplianceStandardsQuestions@ee.doe.gov. Persons who wish to speak should include with their request a computer file in Microsoft Word, PDF, or text (ASCII) file format that briefly describes the nature of their interest in this rulemaking and the topics they wish to discuss. Such persons should also provide a daytime telephone number where they can be reached.

Persons requesting to speak should briefly describe the nature of their interest in this rulemaking and provide a telephone number for contact. DOE requests persons

selected to make an oral presentation to submit an advance copy of their statements at least two weeks before the public meeting webinar. At its discretion, DOE may permit persons who cannot supply an advance copy of their statement to participate, if those persons have made advance alternative arrangements with the Building Technologies Office. As necessary, requests to give an oral presentation should ask for such alternative arrangements.

C. Conduct of the Webinar

DOE will designate a DOE official to preside at the public meeting webinar and may also use a professional facilitator to aid discussion. The webinar will not be a judicial or evidentiary-type public hearing, but DOE will conduct it in accordance with section 336 of EPCA (42 U.S.C. 6306). A court reporter will be present to record the proceedings and prepare a transcript. DOE reserves the right to schedule the order of presentations and to establish the procedures governing the conduct of the public meeting webinar. There shall not be discussion of proprietary information, costs or prices, market share, or other commercial matters regulated by U.S. anti-trust laws. After the public meeting webinar and until the end of the comment period, interested parties may submit further comments on the proceedings and any aspect of the rulemaking.

The public meeting webinar will be conducted in an informal, conference style. DOE will present a general overview of the topics addressed in this rulemaking, allow time for prepared general statements by participants, and encourage all interested parties to share their views on issues affecting this rulemaking. Each participant will be allowed to make a general statement (within time limits determined by DOE), before the discussion of specific topics. DOE will allow, as time permits, other participants to comment briefly on any general statements.

At the end of all prepared statements on a topic, DOE will permit participants to clarify their statements briefly and comment on statements made by others. Participants should be prepared to answer questions by DOE and by other participants concerning these issues. DOE representatives may also ask questions of participants concerning other matters relevant to this rulemaking. The official conducting the public meeting webinar will accept additional comments or questions from those attending, as time permits. The presiding official will announce any further procedural rules or modification of the above procedures that may be needed for the proper conduct of the public meeting webinar.

A transcript of the public meeting webinar will be included in the docket, which can be viewed as described in the *Docket* section at the beginning of this document. In addition, any person may buy a copy of the transcript from the transcribing reporter.

D. Submission of Comments

DOE invites all interested parties, regardless of whether they participate in the public meeting webinar, to submit in writing no later than the date provided in the **DATES** section at the beginning of this document, comments, data, and information on matters addressed in this notification and on other matters relevant to DOE's consideration of potential amended energy conservation standards for consumer water heaters. Interested parties may submit comments, data, and other information using any of the methods described in the **ADDRESSES** section at the beginning of this document.

Submitting comments via www.regulations.gov. The www.regulations.gov webpage will require you to provide your name and contact information. Your contact information will be viewable to DOE Building Technologies staff only. Your contact information will not be publicly viewable except for your first and last names, organization name (if any), and submitter representative name (if any). If your comment

is not processed properly because of technical difficulties, DOE will use this information to contact you. If DOE cannot read your comment due to technical difficulties and cannot contact you for clarification, DOE may not be able to consider your comment.

However, your contact information will be publicly viewable if you include it in the comment itself or in any documents attached to your comment. Any information that you do not want to be publicly viewable should not be included in your comment, nor in any document attached to your comment. If this instruction is followed, persons viewing comments will see only first and last names, organization names, correspondence containing comments, and any documents submitted with the comments.

Do not submit to *www.regulations.gov* information for which disclosure is restricted by statute, such as trade secrets and commercial or financial information (hereinafter referred to as Confidential Business Information (CBI)). Comments submitted through *www.regulations.gov* cannot be claimed as CBI. Comments received through the website will waive any CBI claims for the information submitted. For information on submitting CBI, see the Confidential Business Information section.

DOE processes submissions made through *www.regulations.gov* before posting. Normally, comments will be posted within a few days of being submitted. However, if large volumes of comments are being processed simultaneously, your comment may not be viewable for up to several weeks. Please keep the comment tracking number that *www.regulations.gov* provides after you have successfully uploaded your comment.

Submitting comments via email. Comments and documents submitted via email also will be posted to *www.regulations.gov*. If you do not want your personal contact information to be publicly viewable, do not include it in your comment or any accompanying documents. Instead, provide your contact information in a cover letter.

Include your first and last names, email address, telephone number, and optional mailing address. The cover letter will not be publicly viewable as long as it does not include any comments

Include contact information each time you submit comments, data, documents, and other information to DOE. No telefacsimiles (faxes) will be accepted.

Comments, data, and other information submitted to DOE electronically should be provided in PDF (preferred), Microsoft Word or Excel, or text (ASCII) file format. Provide documents that are not secured, that are written in English, and that are free of any defects or viruses. Documents should not contain special characters or any form of encryption and, if possible, they should carry the electronic signature of the author.

Campaign form letters. Please submit campaign form letters by the originating organization in batches of between 50 to 500 form letters per PDF or as one form letter with a list of supporters' names compiled into one or more PDFs. This reduces comment processing and posting time.

Confidential Business Information. Pursuant to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit via email two well-marked copies: one copy of the document marked "confidential" including all the information believed to be confidential, and one copy of the document marked "non-confidential" with the information believed to be confidential deleted. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

It is DOE's policy that all comments may be included in the public docket, without change and as received, including any personal information provided in the comments (except information deemed to be exempt from public disclosure).

V. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of this notification of availability of the preliminary technical support document and request for comment.

Signing Authority

This document of the Department of Energy was signed on February 13, 2022, by Kelly J. Speakes-Backman, Principal Deputy Assistant Secretary for Energy Efficiency and Renewable Energy, pursuant to delegated authority from the Secretary of Energy. That document with the original signature and date is maintained by DOE. For administrative purposes only, and in compliance with requirements of the Office of the Federal Register, the undersigned DOE Federal Register Liaison Officer has been authorized to sign and submit the document in electronic format for publication, as an official document of the Department of Energy. This administrative process in no way alters the legal effect of this document upon publication in the *Federal Register*.

Signed in Washington, DC, on February 22, 2022.

Treena V. Garrett
Federal Register Liaison Officer,
U.S. Department of Energy